

Hydrothermal Facilities Are Essential in the Age of Pandemics

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Summary

This paper provides evidence to support the classification of hydro-thermal facilities as ‘essential services’ in an age of pandemics. Hydro-thermal therapies such as hot baths, cold plunges, saunas, steambaths and mud-wraps boost the immune system’s ability to resist viral infections, reduce the risk of chronic disease and improve public health. Hydro-thermal therapies also confer psychological benefits that include improved sleep, reduced stress enhanced social connections and connection with nature. Some hydrothermal facilities such as saunas also operate at temperatures that destroy viruses and therefore provide safe havens during a pandemic.

Common-sense safety principles allow hydrothermal therapies to be used safely and education of operators about infection control, disinfection, sanitation and water quality can ensure the safe re-integrating of hydro-thermal facilities into society. Treating hydro-thermal therapies as essential services will bolster public health and counter the many detrimental physical, mental, social and economic impacts of the current pandemic. Ultimately, governments and communities need to support optimal immune function and work toward the long-term goal of building community resilience.

Keywords: hydrothermal therapies, sauna, balneology, public health, COVID-19, bathing

Hydro-thermal Therapies Enhance Health and Wellbeing and Treat and Prevent Viral Infections

The benefits of hydrothermal therapies have been known for thousands of years and have been shown to be effective for disease prevention and health promotion [1-3]. Hydrothermal therapies induce a hormetic stress response that builds resilience and resistance to pathogens and harmful exogenous stimuli and hydrothermal therapies such as saunas, steam rooms, hot baths, balneotherapy, pelotherapy etc are backed by historical,

epidemiological, anecdotal, clinical and randomized controlled-trial evidence that attest to their safety and efficacy [4].

There is evidence to show hydro-thermal therapies such as bathing [5], balneotherapy [6], sauna bathing [7], massage [8] and healing touch [9] are safe and effective in the treatment and prevention of many chronic diseases [10]. Hydrothermal therapies provide cheap, effective and widely available disease prevention strategies that can be used in homes and integrated into conventional healthcare services, aged care centres and other community facilities.

Hydrothermal Therapies Inhibit Viral Virulence

SAR-Cov-2 is an enveloped RNA virus with a lipid envelope that is sensitive to heat and is destroyed by UV light and temperatures over 55°C [11-16]. SAR-Cov-2 is not transmitted via direct skin contact as it must be introduced through mucosal surfaces and gain entry into cells with ACE-2 receptors. Furthermore, SAR-Cov-2 cannot reproduce in water and there is no evidence that COVID-19 can spread to people through water used in pools, hot tubs, or water playgrounds. [17]

Transmission is enhanced in cool dry conditions, which are associated with increased occurrence of respiratory tract infections [18], including infections with SARS-CoV [19] and SAR-CoV-2 [20, 21]. In contrast, warm humid environments reduce airborne droplet spread and inhibit transmission of respiratory viruses, and humidity of around 50% leads to slower infection and less severe illness [22]. Air quality is further enhanced at hot springs and thermal water inhalation is able to modulate and enhance systemic immune responses [23]. Some hydrothermal facilities such as saunas also operate at temperatures that destroy viruses and therefore provide safe havens during a pandemic.

Hydrothermal Bathing Supports Host Resistance

Raising body temperature through exposure to external heat is an evolutionary strategy that has been preserved for over 600 million years and is used by fish, insects, reptiles, birds, and mammals for controlling viral infections [24]. Humans have evolved sophisticated thermoregulatory mechanisms including cellular, physiological and behavioural mechanisms that allow us to happily tolerate temperatures that destroy coronaviruses and such temperatures are commonly found in saunas, which typically have ambient air above 70°C.

There is extensive evolutionary, historical, epidemiological, physiological, psychological and clinical evidence supporting the use of heat to treat respiratory viruses as well as treat and prevent other infections and chronic diseases [25]. Warm humid environments support naso-ciliary clearance, which serves as the immune system's first line of defence against viral respiratory pathogens by trapping viruses, presenting them to the immune system so antibodies can be produced, and then disposing of them before they can cause illness [26]. Recent evidence shows balneotherapy and aquatic therapy improves respiratory function and helps prevent and treat respiratory diseases [27, 28].

Preventative Measures for Operators

Common-sense safety principles (see below) allow heat to be used safely and education of operators about infection control measures, disinfection, sanitation and water quality can ensure the safe re-integrating of hydro-thermal facilities into society. Maintaining optimal air quality by minimising pollution, smoke and volatile disinfection by-products, keeping temperatures between 20-25 degrees and relative humidity between 40 and 60%, are effective measures to enhance naso-ciliary clearance, minimise aerosol spread, and reduce the chance of infection for staff and guests. Gloves are not required for touch-based treatments as they reduce the quality of the experience for both therapist and guests and reduce the therapeutic exchange provided by physical human touch, which operates on many levels and has a direct stimulatory effect on the immune system.

The best way to protect facility staff and guests is to encourage personal health and hygiene practices that include healthy beverages, good sleep and nutrition, exposure to sunlight, minimal stress and anxiety, and regular hot and cold experiences where available. Gloves reduce the quality of the experience for both therapist and guests and reduce the therapeutic exchange provided by physical human touch, which operates on many levels and has a direct stimulatory effect on the immune system. Hydro-thermal therapies may be particularly useful to provide respite and build the resilience to infection for staff working in conventional medical facilities.

Specific research is needed on the ability of heat-based interventions to prevent and treat COVID-19. Such research could be conducted at hydro-thermal facilities through online clinical trial and citizen science platforms that monitor guest health. Whether in a public spa facility, or at home, hydro-thermal therapies can boost our collective immune systems and help us all, today and in the future.

Common Sense Safety Principles

Heat is a powerful force and like any powerful intervention, has the potential to either harm or help. Common sense safety precautions when using heat include;

Drink: Stay hydrated with good quality water.

Take care: Heat sources can burn or scald and sudden changes in posture can lead to dizziness or fainting;

Know your limits: Heat tolerance varies widely between individuals and within the same individual at different times. Use your comfort level as a guide to exposure and don't go beyond the point of being 'comfortably uncomfortable'.

Be aware: Tune into your senses, monitor your tolerance and enjoy heat-induced 'forced mindfulness'. Avoid extremes of temperature when under the influence of alcohol or drugs that impair your judgement;

Rest: Alternate exposure to hot or cold with relaxation and re-balancing periods. Spend at least as much time resting and coming back into physiological balance as you spend in extremes of temperature.

Hydrothermal Therapies Build Community Resilience

Bathing is essential for good health and investments in clean water initiatives that provide access to bathing support individual, community and global health. Regular heat-based treatments such as saunas, steam rooms, hot spring bathing, hot mud wraps, etc., build physiological and psychological resilience and lead to lower overall morbidity and mortality. Hydrothermal therapies also provide psychological benefits that are difficult to overstate. These benefits can help overcome the trauma and feelings of helplessness from forced confinement and uncertain economic and social circumstances, and include improved sleep, reduction of stress and anxiety, connection with nature and social connection [29-31].

Hydrothermal facility operators, staff, guests and local communities require reassurance, communication and education on cleaning protocols and hygiene measures, and special facilities or procedures are required to protect people who are sick, immuno-compromised, or more vulnerable to infection. Education is also required on how hydrothermal treatments can be done at home using hot baths or showers in conjunction with cold showers or foot

baths. Supporting hydrothermal bathing as a regular lifestyle activity builds community resilience, provides medical personnel with respite, and contributes to culture of wellness that can mitigate the impact of current and future pandemics.

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